Marketing modeling reality and the realities of marketing modeling

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Abstract This paper shows how analytic modeling research in the Marketing field is focused on answering questions of "How?" and "Why?" It describes the disciplines involved in analytic modeling; examines how the key criteria of *parsimony* and *robustness* help to define a good model; and discusses other

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goodness criteria, including appropriate use of analytic techniques, applicability of the model to institutionally rich, real-world problems, non-obvious results, generalizability, and ability to provide insight where other research techniques do not work. The paper defines and discusses key concepts in analytic models of distribution channels, including double marginalization, coordination, incentive alignment and contract design, strategic substitutability and complementarity, externalities, and principal–agent problems. Next, the paper summarizes research presented in the session on analytic models in channels at the Erin Anderson conference; and finally, the paper suggests avenues for future analytic modeling research.

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1 Analytic modeling: a focus on "how?" and "why?"

To cover a story, journalists are taught to ask six questions: Who? What? When? Where? How? Why? To analyze a topic, academic marketing researchers focus on the How and Why questions with the goals of explicating the key forces behind marketing phenomena, specifying the mechanisms by which they interact, and measuring the relative sizes of various effects. The answers to the Who, What, Where, and How questions are generally used to parameterize the model by describing consumer or buyer behavior, segmentation, and industry and competitive characteristics.

Explication, specification, and measurement can be accomplished from the perspectives of a variety of disciplines (e.g., social psychology, sociology, and economics) and methodological approaches (e.g., analytical modeling, econometrics, experiments). Our focus is on analytical modeling. We begin with examples of How and Why questions that have been addressed in analytical models of marketing channels:

- *How* can manufacturers induce decentralized retailers to provide the right level of service and charge the right prices to consumers? (Jeuland and Shugan 1983; Moorthy 1987; Iyer 1998).
- *Why* are some manufacturers vertically integrated while others use independent retailers? (McGuire and Staelin 1983; Coughlan 1985; Moorthy 1988; Coughlan and Wernerfelt 1989).
- *How* does selling products from multiple manufacturers affect the share of channel profit earned by manufacturers and their common retailer (Choi 1991)?
- *Why* is there an inverse relationship between manufacturer and retailer margins (Lal and Narasimhan 1996)?
- *How* can a manufacturer coordinate a channel composed of multiple retailers—and *Why* should it do so (Ingene and Parry 1995a, b)?
- *How* can a manufacturer coordinate a channel that is dominated by a "power retailer?" (Raju and Zhang 2005)?
- *Why* do manufacturers over-advertise their new products during the time that they need to be slotted at a retailer's shelf (Chu 1992)?
- *How* do retailers benefit from extended service contracts or warranties? (Padmanabhan and Rao 1993; Soberman 2003).

As these examples suggest, the starting point for analytical modeling is the phenomenon whose existence may be self-evident or documented by other empirical studies. The questions then asked are: Why does this phenomenon happen? How can we explain this phenomenon? These questions suggest a pedagogical motive, but analytical models are much more than theory-building for theory's sake. Analytic models are inherently strategic in their focus because they seek to explain heretofore unexplained phenomena and use the acquired insight to improve decision making and profitability. Such models thus form the basis for rigorous empirical work that goes on to measure "effect sizes"—how important the various forces are that drive the phenomenon. And in turn, these insights form the basis for giving advice to managers about how they can improve their decisions and increase their profits.

Analytic models are characterized by precision of expression. As Moorthy (1993) argues, the requirement to depict a market mathematically imposes a discipline on the modeler that does not permit verbal nuance; the assumptions about consumers, firms, competition, and the environment are laid bare for everyone to see. This step in the development of analytical models is critical because the modeler is forced to capture the essence of a context through the model's assumptions, while limiting the complexity of the model so that insight is forthcoming. Constructing models that are sufficiently parsimonious to allow sharp clear insights is challenging, but to fail to do so is to risk creating a model that "reflects everything… but from which one learns nothing."

This precision is helpful in developing and refining our intuition about complicated problems because it makes explicit the modeler's assumptions about the marketplace and consumers. The assumptions are also useful because they clearly define the limits to which the model applies.

Analytic models are especially valuable when they generate insights that are conditional or strategic in nature, as opposed to "first-order" or "main" effects. Such effects can be very difficult to document empirically, either because they cannot be disentangled from the web of factors interacting in a complicated real-world market or because their incremental effect on outcomes may not be measurably large. Even if such effects appear to be statistically small and/or entangled in a web of other factors, however, they can be of great economic importance to firms in terms of the profit improvements they entail; presumably, the forces of competition lead successful competitors to find the "main effects" that can be exploited, but the strategic effects modeled by analytic researchers may not be as quickly discovered and may therefore confer a differential benefit on the firm that discovers them.

This focus puts a burden on the analytic modeler. Even though analytic models are not designed to measure the size of an effect precisely, they still must be held to a standard of excellence in order to understand when to prefer one model over another. The principle of Ockham's razor[1] suggests the need to balance two key elements in assessing the quality of an analytic model: *parsimony* and *robustness*.

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[1] Ockham's razor is the principle that a theory should make as few assumptions as possible, and in particular, should omit assumptions that have no effect on the predictions of the theory. This principle is attributed to William of Ockham, an English logician and Franciscan friar who lived in the fourteenth century. The philosopher Karl Popper argued that a simpler theory is preferred to a more complex one because it is more easily falsifiable, being applicable in more situations. These two concepts together suggest the value of *parsimony* as well as *robustness*, and also clearly set up the tension between the two concepts.

A *parsimonious* model is one that focuses on the truly important aspects of a problem. It does not represent all aspects of consumer behavior, competitive interaction, or firm characteristics, but it cleanly analyzes the problem of interest with the barest minimum of necessary assumptions. Such models are often praised for their elegance.

A *robust* model is one whose findings or predictions hold up to the relaxation of its assumptions. For example, a monopoly market structure assumption in a channels modeling context may help the analyst derive interesting, elegant, and closed-form results predicting how products are priced, which consumers will be targeted, or what the split of total channel profits is likely to be. However, one can legitimately ask whether that monopoly model's results and predictions are *robust* to the relaxation of the monopoly assumption: specifically, will the results still hold if one introduces competition at either the manufacturing or retailing level of this channel model? This is precisely what McGuire and Staelin did by introducing competition between channels in their 1983 paper; their approach reversed many of the results found in models without competition. In turn, their results were generalized in a paper by Moorthy (1988), which linked the profitability of channel decentralization to the products' strategic substitutability or complementarity in demand. Coughlan and Wernerfelt (1989) further extended modeling insights by showing that these results depended on contract observability in the channel. Analytic research advances thus seek ever greater generalizability and robustness with successive contributions to the literature; more robust models increase the external validity of the theory.

Both parsimony and robustness are valued in assessing the quality of an analytic channels model, as are the importance of the phenomenon investigated and the clarity of insight provided (the same holds true for models in other areas of Marketing). However, these two goals are often in conflict. Parsimonious models may be needed for analytical tractability, but their external validity may be called into question; conversely, more realistic models, with a multitude of effects, may not admit elegant, closed-form solutions. The analytic modeler must balance parsimony and robustness in the pursuit of an interpretable model that nevertheless comes up with interesting, believable, and enduring truths.

2 What makes for a good analytic marketing model?

Moorthy (1993) discusses internal and external validity issues in analytic modeling. Here, we extend the discussion to reflect our joint discussion at the conference some 15 years later.

Several criteria can be applied to assess the goodness of an analytic model. Each of these criteria assesses a different aspect of the modeling enterprise. Not every successful or well-regarded analytic model meets every one of these criteria. Nevertheless, the criteria jointly identify a piece of research that is both technically well done and intellectually impactful in our field.

First, a good analytic model uses techniques appropriate to the problem at hand and of course, makes no technical mistakes. This implies that the major contribution of an analytic model may not be the development of a new analytical methodology, but rather the derivation of results that the technique makes possible. The principle of Ockham's razor, discussed above, dictates that there is little virtue in applying the most abstruse

and complicated technique possible, if the same results can be derived through simpler methods. Of course, to the extent that development and/or application of more sophisticated mathematical methods make possible the derivation of more general results, Marketing modelers (as modelers in other disciplines) value the ensuing increased robustness of the results, and hence, their external validity.

Second, good analytic modeling is couched in institutionally rich, real-world problems. Ideally, the research inspiration comes from one or more real-world observations, problems, or conundrums the researcher has come across; only then does the researcher think about the appropriate analytic tools to apply to best attack the problem. Conversely, if the researcher is motivated only by the ability and desire to put his or her "tool" to work, the resulting analysis may yield an irrelevant result.

The third "goodness" criterion is that the results from the analytic model should not be something that a "smart MBA" could figure out without the model.[2] Of course, what a "smart MBA" can figure out is evolving as "smart MBAs" get exposed to more analytical models. For example, circa 1983, channel coordination issues of the sort highlighted in Jeuland and Shugan (1983) were fairly obscure, and the idea of using nonlinear contracts to coordinate the channel was novel. We conjecture that "smart MBAs" then would have found the model insightful even if today's "smart MBAs" don't. Note that by this criterion, the fact that a well-written introduction to an analytic modeling paper clearly explains the mechanism by which the model's results are derived should not disqualify it from publication because of the reader's reaction that the results are "obvious"; reviewers and readers should evaluate a paper without this *ex post* bias. The key is whether the model succeeds in teaching us something we did not intuit or know beforehand.

Fourth, a good analytic model has influence beyond the immediate analysis at hand. Such models are spurs to future research, some of which may extend broadly beyond the first modeling effort. For example, Hotelling's seminal location model (1929) not only heavily leaned in the "parsimonious" direction, but also was later found to have an error in the calculation of the equilibrium. Nevertheless, it has profoundly influenced the way we model competition and differentiation, both in channels and competitive strategy generally. The location modeling concept allows researchers to examine not just spatial differentiation, but other forms of horizontal product differentiation. It has also sparked the related literature on vertical (quality) differentiation.

Finally, good analytic models can contribute by permitting the analysis of a market or a problem where other tools simply do not (or do not yet) work. Very new marketplace phenomena, or market phenomena where data are not widely available, can nevertheless be amenable to analytic investigation and prediction. For example, analysis of the possible impact of allowing a particular channel pricing strategy that is currently under antitrust control, such as resale price maintenance, can be conducted to predict the impact of changing regulations; conversely, an analysis of prohibiting a currently allowed process (such as slotting allowances) can also be analyzed through the lens of analytic modeling, in the absence of data. Even where data may be (or become) available, good analytic models permit "what-if" analyses that allow managers/policymakers to understand how changes in the parameters of their problem ought to affect their strategies/policies. Often these "comparative statics" are the basis for later empirical work.

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[2] The "smart MBA criterion" is attributed to Rick Staelin.

What constitutes an analytical model is ever-changing. As alluded to above, closed-form solutions should not be seen as the *sine qua non* of such modeling efforts. If that were so, only simple models would be publishable, and simple models may not be able to explain complex phenomena. By the "low-hanging fruits theory," such complexities are likely to be seen more and more as our field evolves. We believe that the value in analyzing such interesting and applicable problems outweighs the loss in elegance or parsimony in their expression. Future analytical modelers will increasingly bring a new set of tools to bear on these problems, for example, numerical analysis, simulation, and scenario analysis; it is hoped that reviewers as well as researchers will adopt and accept such techniques.

With this understanding of the nature and value of analytic modeling, we turn to an assessment of some key terms and concepts that have been of enduring importance in the Channels modeling area. We follow this with a summary of the research presented in our session of the Erin Anderson Memorial Conference, using one or more of these key concepts to discuss the results or intuition coming from each particular paper. Finally, we discuss the future of analytic modeling in the Marketing Channels area.

3 Key concepts in channels modeling

3.1 Double marginalization

Double marginalization is one of the basic concepts in the study of channels and channel management. It is well-known that when more than one profit-maximizing firm in a channel faces a downward sloping demand curve, then the sequence of mark-ups leads to higher retail prices than if the firms were vertically integrated. Moreover, unless this channel is in a highly competitive industry (see McGuire and Staelin 1983, reprinted in 2008), the standard result is that the combined profits of all the individual channel members is lower than profits associated with vertical integration.

3.2 Coordination

Given the problems with double marginalization, numerous analytic papers have addressed the issue of how firms might go about reducing the impact of double marginalization. The definition of coordination in this context is the provision of incentives to the downstream firms that induce them to behave in a manner that is compatible with the behavior of a vertically integrated firm. Specifically, this means that the retail price charged by the downstream retailer is equal to the retail price that the vertically integrated firm would charge.

3.3 Incentive alignment and contract design

Numerous analytic papers have addressed the issue of coordination by designing contracts that align the incentives of the individual channel members in such a way that their behavior produces the same retail price as would be charged if the channel was vertically integrated. The number of possible contracts is large, but some of the more common ones are quantity discounts, two-part tariffs, and sales quotas.

3.4 Strategic substitutability and complementarity

Strategic substitutability (complementarity) refers to situations where the decisions of two or more players mutually offset (reinforce) one another. Products in games that are played in quantities tend to exhibit strategic substitutability, i.e., when one firm increases quantities the other finds it best to decrease quantities, while products in games played in prices tend to exhibit strategic complementarity. Likewise, different demand functions can lead to different sets of optimal responses from each player. See Lee and Staelin (1997) for some channel examples.

3.5 Externalities

An externality exists when either the full benefit (positive externality) or the full cost (negative externality) of one market player's action is not felt by that market player. For example, a Bertrand (price-setting) game between a manufacturer and a retailer (such as that modeled in Jeuland and Shugan 1983) exhibits the negative externality of double marginalization (as discussed above): neither player bears the full cost of pricing too high, as some of the "pain" of lower-than-first-best demand is felt by the other channel partner. Because the externality is therefore not fully "internalized," the resulting market prices are higher than the channel profit-maximizing level. Conversely, an example of a positive externality is an investment in advertising by one retailer in a multi-retailer channel system, which creates positive spillovers (i.e., a positive externality) that benefits all other retailers (and the product manufacturer as well). In general, negative externalities leads to "too much" of a bad behavior, while positive externalities lead to "too little" of a good behavior, relative to the system optimum. One of the unifying principles of channel coordination research is the search for channel structures, transfer pricing systems, and compensation plans that effectively internalize externalities in order to achieve (or move closer to) a first-best solution in the system.

3.6 Terminology for situations of asymmetric information within a channel

Many analytical studies of channels examine situations in which one channel member lacks key information related to channel performance that another member of the channel either possesses or controls. In fact, a key focus of Erin Anderson's research was identifying key determinants of performance in contexts such as this, i. e., the Principal–Agent context. There are two bases for most Principal–Agent models: the Adverse Selection problem and the Moral Hazard problem. The Adverse Selection problem occurs when a first channel member needs to contract with a second channel member and the first channel member lacks information about the second channel member that impacts the performance of the channel (Akerlof 1970 and Rothschild and Stiglitz 1976). This is also known as the problem of "hidden information." In contrast, the Moral Hazard problem obtains when a first channel member needs to contract with a second channel member and the second channel member takes a costly action after contracting that is either unobservable or non-contractible (Arrow 1964; Pauly 1968). This is also known as a problem of "hidden action." A typical example of an Adverse Selection problem in a channel context is

franchisee selection. Conversely, there are many studies that examine sales agent remuneration and these are fundamentally grounded in a problem of Moral Hazard.

4 Analytic channel research topics represented at the Erin Anderson Memorial Conference

Nine papers were presented in the track on analytic modeling of channels problems at the conference. The papers fell into two broad categories: (a) research on specific, timely topics in the channels area and (b) research dealing with methodology issues or how the "rules of the game" are structured in analytic models. In this section, we briefly summarize the research presented, with a view toward illustrating the points made above in the general discussion of analytic models in Marketing. Specifically, where appropriate, the research summaries highlight:

- the "How?" and "Why?" questions attacked in the research;
- the ways in which the analytic modeling forced the researcher to precisely represent the phenomenon being modeled;
- the conditional insights generated;
- the puzzles or conundrums explained;
- the parsimony/robustness trade-off faced in this research;
- an institutionally rich real-world problem context;
- results that pass the "smart MBA" test; and
- possible applicability of the model's results to other contexts not specifically modeled.

5 Papers dealing with interesting how and why questions

5.1 "Location of a branded retail store: Let the consumers shop around"
by S. Chan Choi and Minhi Hahn

5.1.1 "How?" and "why?" questions attacked in the research

We observe that many branded retail stores are frequently located inside shopping malls in which there are direct competitors located practically next to each other, but many can also be found as free-standing stores on busy streets. This paper examines whether intense competition is indeed a liability, by modeling retail competition as a duopoly game with respect to price and informative advertising. Retailer differentiation is captured in a Hotelling-style horizontal differentiation model, and the effect of advertising is represented as the probability of consumers being informed of the retailer.

5.1.2 Insights for the "smart MBA"

When advertising is cheap and products are differentiated, it is not always more profitable for retailers to locate far from each other. There is an *optimal distance* between two retailers that maximizes equilibrium profits. This is because when retailers are located close together, one retailer's advertisement has a spillover effect

on its competitor and vice versa. Comparison shopping behavior by a certain fraction of consumers reduces equilibrium advertising spending and allows the retailers to increase prices. Consequently, contrary to the conventional wisdom, it can be more profitable to locate a retail store close to the competing store and allow a portion of consumers shop around. The model can be extended to evaluate a price-matching strategy, which is also affected by the proximity of competing retail stores.

5.2 "Channel pricing in lean and lucrative markets," by Wujin Chu

5.2.1 "How?" and "why?" questions attacked in the research

In the US domestic market, first-degree price discrimination is prohibited by the Robinson–Patman Act. However, in international distribution channels, where manufacturers are not confined by laws that "restrict selling the same product to different buyers at different prices," we sometimes find that distributors that order in larger quantities also pay higher prices (i.e., pay a price premium). While linear demand-based price menus have been shown to lead to quantity discounts (Ingene and Parry 1995a, b, 1998; Balachander and Srinivasan 1998), quantity premia can also be optimal under broader demand conditions. This paper assumes that demand consists of high-valuation and low-valuation consumers and allows total market size to be large or small. The market is "lucrative" ("lean") if it has a high (low) proportion of high-type consumers. The retailer decides whether to sell to all consumers at a low price, or only to high types at a high price, and the manufacturer sets a menu of wholesale prices. The model shows that when the size of the lucrative market is larger than the size of the lean market (e.g., a high-income urban market with many people and a small low-income rural market with fewer people), the manufacturer will set a quantity-premium menu such that retailer in the lucrative market will choose the high-price/high-quantity pair, and retailer in the lean market will choose the low-price/low-quantity pair.

5.2.2 Insights for the "smart MBA"

The retailer facing a lucrative market is willing to pay a high price in order to buy in large quantities because buying in smaller quantities will result in missed sales opportunities. In this sense, a quantity premium is a form of "quasi-rationing": those who pay higher prices are allowed to buy more. Instances of quantity premia can be found in the auto parts, petroleum, and beverage industries.

5.3 "Selling your product through competitors' retail outlets," by Yongmin Chen and Sridhar Moorthy

5.3.1 "How?" and "why?" questions attacked in the research

The basic motivation for the paper is the apparent incongruity between the academic literature singing the praises of vertical integration and the institutional reality that many retailers who are vertically integrated actually carry competing brands. For instance, Sears behaves as a vertically integrated retailer with its Kenmore appliances and Craftsman tools, but also carries competing national brands like

Whirlpool and DeWalt. What, then, determines whether a vertically integrated retailer takes on a competing manufacturer's products into its outlets and from the competing manufacturer's viewpoint, whether it sells through such outlets?

5.3.2 Insights for the "smart MBA"

The paper highlights two main reasons for this phenomenon. The first is strategic: taking on a competing brand mutes competition at the retail level, while giving the national brand manufacturer access to the vertically integrated retailer's loyal consumers. The downside is that the vertically integrated retailer will favor its own brand, but when national brand loyalty and store loyalty (to the vertically integrated retailer) are both high, the former considerations outweigh the latter, and being in the vertically integrated retailer's outlets is optimal. The second reason is to reduce consumer shopping costs by providing one-stop comparison shopping, inducing some consumers to shop who would otherwise stay home.

While the results described above have been obtained in a fairly stylized setting, the intuitions appear sufficiently robust. For instance, absent space and cost considerations, the incentive for a retailer to take on another brand is based on the ideas that two revenue streams are better than one, consumers like one-stop shopping, and category management can be counted on to steer consumers to the higher-margin brand.

5.4 "Who prices? Manufacturer versus retailer control of retail prices," by V. Padmanabhan, Nils Rudi, and Ilia Tsetlin

5.4.1 "How?" and "why?" questions attacked in the research

The core of the research problem posed to us by one of the leading agrochemical firms operating across Asia was: "when should we intervene in retail price setting and when should we let retailers price as they see fit?", in markets characterized by uncertainty in demand, variation in intensity of retail distribution and correlation of demand across retailers. The wide variance in regulations relating to Resale Price Maintenance across countries in Asia implies that MNCs could indulge in retail price setting in many countries, a useful tool to fight the eruption of retail-level price wars that can damage brand equity. The problem is similarly of interest for telecom firms in developing countries; sunglasses maker Oakley in North America; and L'Oreal and Levi's in Europe.

5.4.2 Insights for the "smart MBA"

It is better for the manufacturer to actively manage price-setting in markets with selective distribution versus in those with intensive distribution. However, this effect is muted under high uncertainty because retailers are better able to adjust to uncertainty through their retail pricing decisions. The implication in terms of profit is that the manufacturer would be better off delegating pricing responsibility to its retailers in product categories and countries that are characterized by high variance in demand. Total channel surplus (channel profit plus consumer surplus) is higher when retailers determine retail prices, with high demand uncertainty, and with intensive distribution, even though retail profits are then lower. This implies that while retailers prefer delegating pricing responsibility to

the manufacturer in these conditions, it would be in the manufacturer's and consumers' interests not to accept pricing responsibility.

5.5 "The competitive consequences of using a category captain," by Sanjay Dhar, Jagmohan Raju, Upender Subramanian, and Yusong Wang

5.5.1 "How?" and "why?" questions attacked in the research

Since its conception in the early 1990s, category management has become an integral part of retail strategy (e.g., Business 2.0 2003; Hofstetter 2006). Both smaller retailers and larger ones like Wal-Mart, Kroger, Target, Safeway, and H-E-B now often partner with a "category captain" manufacturer to help them manage an entire category (Blattberg and Fox 1995; FTC Report 2001). Retailers and manufacturers reportedly attribute 19% and 12% growth in sales, respectively, to such collaborative initiatives (Progressive Grocer 2007).

   The use of category captains has led to concerns among marketing researchers (Gruen and Shah 2000; Lindblom and Olkkonen 2008) and legal scholars (e.g., Wright 2006; Carameli 2004) about the category captain's (lack of) objectivity and consequent potential to harm the interests of the retailer, rival manufacturers, and consumers. This paper examines how the use of a category captain affects channel members, depending on the role or responsibility assigned to the category captain.

5.5.2 Insights for the "smart MBA"

Provision of in-store demand-enhancing services The results suggest that the retailer always benefits from such services and even the rival manufacturer may benefit, if the category captain's services are not too biased. The scope for the rival to benefit increases with increased market competition.

Collaboration in pricing decisions Pricing collaboration between the category captain and the retailer leads to lower retail price for the category captain's brand since category captain and retailer interests are better aligned; this forces the rival manufacturer to reduce its wholesale price to stay competitive (although its sales also decrease). Lower category retail prices thus increase consumer welfare.

Sharing of demand information The sharing of demand information within the channel is commonly thought of as an efficiency-improving measure. However, this paper finds that when such information is used to set prices, consumers are worse off because of accentuated double marginalization, and total channel profits may also decrease.

5.6 "Behavior and location based price discrimination in a model with overlapping generations of consumers," by David A. Soberman

5.6.1 "How?" and "why?" questions attacked in the research

Many sellers gather and record demographic, ownership and personal information from each buyer at the time of purchase. This gives the seller the opportunity to offer

a price to a past customer that is uniquely tailored to the customer based on her willingness to pay (location-based price discrimination). This capability raises a number of questions. The first question is "will this capability lead to higher or lower profits in a competitive industry?" and the second question is "do the findings depend on the relative ease with which each competitor can implement these pricing practices and the evolution of consumer preferences over time?"

This research shows that firms create segments through the simple act of serving them: customers that were served by the firm in question and customers who were not served by the firm in question (behavior-based segmentation). The research examines whether the recognition of endogenously generated segments like this provides a basis for improved decisions. In fact, the research further analyzes the impact of strategies that consider both traditional and behavior-based segmentation simultaneously.

5.6.2 Insights for the "smart MBA"

First, when customer preferences are stable over time, firms' profits increase when they both implement behavior- and location-based price discrimination. When customer preferences change over time, the impact of the practice is ambiguous. Second, when consumers think ahead, behavior- and location-based pricing is more profitable for competing firms; customers suffer as a result of "more careful" decision making. The model also explains why the pricing strategies in industries where firms have good information on past customers have become increasingly sophisticated (such as travel, telecommunications, and cable entertainment services). This practice has the potential to increase profits even if competitors respond with similar practices.

5.7 "Pursuit of retailing dominance: Market dominance, channel dominance, or both?" by Kinshuk Jerath, Steve Hoch, and Z. John Zhang

5.7.1 "How?" and "why?" questions attacked in the research

Today's power retailers are not all alike; some dominate other small retailers by explicitly undercutting on price (market dominance). Some also pursue a strategy of participating in setting the wholesale price (channel dominance). Wal-Mart seems to simultaneously exercise both market and channel dominance (dual dominance), while others, e.g., Sears and Costco, seem to exercise channel dominance alone. Upstream manufacturers complain of being squeezed by power retailers, but many have profitable partnerships with them (e.g., P&G with Wal-Mart and Whirlpool with Sears).

This paper poses the following question: how will a self-interested power retailer trade off between the possible strategies, and how does its dominance strategy affect the welfare of other channel members such as weak retailers and consumers?

The analysis shows that a power retailer can exacerbate the double marginalization problem at the expense of the manufacturer by pursuing the market dominance strategy. Competing retailers are all better off under such a strategy, as the dominance in price by the power retailer discourages price competition and hence raises retail prices. A channel dominance strategy can improve channel efficiency without necessarily hurting a weak retailer, as the manufacturer looks after the weak retailer, from whom it gets a higher

margin. Therefore, a power retailer may not always want to pursue a dual dominance strategy. Most importantly, all channel members can be better off if the power retailer pursue the optimal dominance strategy.

5.7.2 Insights for the "smart MBA"

The paper comes to a rather reassuring, albeit surprising, conclusion that dominance by power retailers is not always a menacing force in the retailing industry and that it can be a force of efficiency benefiting all channel members as well as consumers.

6 Papers that address broad and/or methodological issues

6.1 "Simplifying assumptions in game-theoretic models of distribution channels," by Charles A. Ingene and Mark E. Parry

6.1.1 "How?" and "why?" questions attacked in the research

Game-theoretic modelers often make simplifying assumptions that enhance the mathematical tractability of their models. Yet the very parsimony of a model can compromise the robustness of its insights. We show that even the most basic assumptions can have substantial consequences.

The "how" of our research is to relax *four very common* simplifying assumptions; the "why" is to understand the impact of these assumptions on *three wide-spread beliefs* in analytical channel models. The three beliefs are that (a) coordination (i.e., maximization of total profits) can benefit all channel members; (b) double marginalization precludes coordination; and (c) the retailer-participation constraint is binding. The four common simplifying assumptions are (a) constant channel breadth (i.e., one manufacturer–one retailer; one manufacturer–two retailers, etc.); and, for members at the same channel level, (b) equal demand, (c) equal variable costs, and (d) equal (often zero) fixed costs. When (b) and (c) hold, the retailers are *behaviorally homogeneous*—they set the same prices, sell the same quantities, and reap the same revenue. To analyze the effects of these assumptions, we use the utility function of a representative consumer to derive a linear-demand system that is compatible with any channel breadth.

6.1.2 Insights for the "smart MBA"

We deduce five insights from our model. First, maximization of total system profit is generally incompatible with separately maximizing profit from each channel dyad. Rather, total profit is maximized by vertical plus horizontal integration of the industry, *not* by vertical integration of a channel. Industry maximization dominates channel maximization (although channel and industry maximization are the same if the retailers are (1) not in competition or (2) face identical demands and costs). Since neither (1) nor (2) are real-world appealing, the common simplifying assumptions (b)–(d) generate misleading results. That is, assumptions intended to enhance parsimony and tractability significantly reduce robustness.

Second, double marginalization is *required* for total profit maximization (i.e., for industry coordination) except in the special case of no competition between retailers.

Third, when competitors are *not* behaviorally homogeneous, the Stackelberg manufacturer uses a coordinating contract *only* if the lower margin competitor has lower fixed costs. Thus, models that assume equal demand and equal costs cannot be robust.

Fourth, if one (or more) of assumptions (b)–(d) holds, it is *not* in the manufacturer's interest to serve a constant channel breadth over all parametric values; therefore, no bilateral-monopoly model is fully robust—nor is any multilateral-monopoly model.

Fifth, the well-known participation constraint is irrelevant; a Stackelberg leader excludes some retailers who would like to be members of the channel system. It is the manufacturer's "channel inclusion constraint," not the retailer's channel participation constraint, which matters.

6.2 "Meta-analytic approach to multi-brand, multi-outlet channel systems," by Rick Staelin, Eunkyu Lee, Weon Yoo, and Rex Du

6.2.1 "How?" and "why?" questions attacked in the research

This paper develops some general facts about firm profits in a multi-brand, multi-outlet environment, where the outlets can be physical stores or internet outlets, and the outlets can carry one or more of the competing products.

The paper first "captures" different observed channel structures via nine different channel structure models. It then explicates how to model environments that vary along the following four lines: (a) the degree of brand differentiation, (b) the degree of store differentiation, (c) whether the channels are vertically integrated or decentralized, and (d) the distribution of consumers in terms of product preferences, spatial preferences, and disutility in using the Internet.

Since the environment studied can result in very complex demand formulations, the paper develops a methodology for generating demand functions for the different environments holding fixed the assumed underlying consumer behavior model. The paper then explicates a numerical search approach to find the equilibrium prices and quantities for each market environment and channel structure and uses these results to estimate the general model of firm profits as a function of the abovementioned key underlying factors.

6.2.2 Insights for the "smart MBA"

The paper presents a number of findings that at first blush are surprising. For example, it shows that the profits of one competing manufacturer who only uses a big-box retailer to distribute its product can actually increase if the other manufacturer decides to open up an Internet outlet in addition to using the big-box retailer. The methodology also provides a means to identify how, and the extent to which, the four market environment factors affect firm profits. Total channel profits are greater when the channel systems are not vertically integrated if inter-brand competition is high. Interestingly, intra-brand competition has no effect on total channel profits. In contrast, manufacturer (retailer) channel power is positively

(negatively) related to intra-brand competition and the degree of vertical integration within the channel system and negatively (positively) related to inter-brand competition.

Numerical analysis and scenario analysis are two techniques that can be used to exposit the results of more complex channel models. Since the authors use both of these techniques, it is their hope that others will build upon the methodology put forth in this paper to solve other complex marketing channel issues.

7 Future research directions: so many topics, so much modeling to do

There are many opportunities for research in the Channels area using analytic modeling techniques. Some are driven by novel technologies that are changing the face of distribution; some involve the integration of Channels research topics with topics in other areas of Management research; others reflect the importance of various environmental factors that have received little attention. Following is a brief summary of some key topic areas that show promise for the ability of analytic models to generate insight:

- Insights into the simultaneous management of multiple channel types in a competitive marketplace:

  ◦ How can (and how should) a manufacturer manage a channel system including a traditional bricks-and-mortar set of outlets and an online offering?
  ◦ How can (and how should) a manufacturer manage a channel system including large box stores, small mom "n" pop stores, and various numbers of intermediaries linking to each?
  ◦ How do consumer segmentation patterns favor various hybrid and multiple channel systems?

- How to structure and manage quasi-integrated channel systems, such as outsourcing, cooperatives, and strategic alliances
- The use of new marketing systems in channel management, such as:

  ◦ "Google-mediaries"
  ◦ Two-sided markets
  ◦ Auctions such as e-Bay

- The interface between legal policy and channel management, including more research on topics such as:

  ◦ Slotting allowances
  ◦ Resale price maintenance
  ◦ Minimum advertised price policies
  ◦ Functional discounts

- The interface between Channel management—with its more demand-facing viewpoint—and Operations management—with its more cost-focused viewpoint, including more research on problems such as:

  ◦ Reverse channel management (recycling, reuse, refillable containers, product returns, e.g., Shulman et al. 2009)

- ◦ Production patterns that do not result in "made-to-stock" inventories (that is, inventory that is instantaneously available whenever needed to satisfy demand)
  - ◦ The extent to which just in time manufacturing techniques can be applied to traditional channels
- Models incorporating behavioral concerns such as fairness and bounded rationality (Croson and Donohue 2006; Loch and Wu 2008; Cui et al. 2007; and Lim and Ho 2007).
- Channel management in developing economies, including:

  - ◦ How micro-financing affects the feasibility of channel operations in these markets
  - ◦ Why channels include more vertical levels in developing economies than in developed economies
  - ◦ How to operate an international channel that involves a developing economy either supplying—or being supplied by—a developed economy

- Environmental conservation factors in channel management:

  - ◦ The effect of "buying local" on optimal channel structure
  - ◦ The inclusion of social welfare measures alongside individual firm or channel profit maximization goals
  - ◦ Recycling and reuse of goods, with a linkage to the existing research on new versus used goods

- Financial market channel analysis:

  - ◦ The role of intermediaries in the creation as well as sale of financial instruments
  - ◦ The implications of disintermediation for information and uncertainty in the sale and purchase of complex financial instruments
  - ◦ The impact of channel structure in the financial industry on market volatility

We encourage our colleagues to tackle some of these research problems in the future.

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